Amendment to the Claims

1. (currently amended) An apparatus for seismic data acquisition comprising:

a) a sensor unit for sensing seismic energy, the sensor unit providing a signal indicative of seismic energy sensed by the sensor unit;

b) an acquisition device co-located with the sensor unit and coupled thereto for receiving the signal;

c) a memory unit having a first memory disposed in the acquisition device for storing in digital form information indicative of the received signal;

d) a second memory for storing a location parameter associated with the sensor unit; and

e) a communication device for providing direct bi-directional communication between the acquisition device and a remotely-located central controller.

2. (original) An apparatus according to claim **1**, wherein the sensor unit and the acquisition device are housed in a common housing.

3. (original) An apparatus according to claim **1**, wherein the sensor unit and the acquisition device are coupled together with a cable.

4. (original) An apparatus according to claim **1**, wherein the sensor unit includes one of a velocity sensor and a pressure sensor.

5. (original) An apparatus according to claim **1**, wherein the sensor unit includes an accelerometer.

6. (original) An apparatus according to claim **1**, wherein the sensor unit further comprises a multi-component sensor.

7. (original) An apparatus according to claim **1**, wherein the sensor unit further comprises a multi-component accelerometer having a digital output signal.

8. (original) An apparatus according to claim **1** further comprising an analog-to-digital converter disposed in the sensor unit, the signal provided by the sensor unit including a digital signal.

9. (original) An apparatus according to claim **1**, wherein the signal is an analog signal, the apparatus further comprising an analog-to-digital converter disposed in the acquisition device for converting the signal to digital data.

10. (original) An apparatus according to claim **1**, wherein the first memory further comprises a nonvolatile memory.

11. (original) An apparatus according to claim **1**, wherein the first memory further comprises a removable memory.

12. (original) An apparatus according to claim **1**, wherein the first memory further comprises one or more of a miniature hard disk drive and a nonvolatile removable memory card.

13. (original) An apparatus according to claim **1**, wherein the memory unit includes an inductive coupling device for transferring the information stored in the memory unit to an external device.

14. (original) An apparatus according to claim **1**, wherein the memory unit includes an optical coupling device for transferring the information stored in the memory unit to an external device.

15. (original) An apparatus according to claim **1**, wherein the sensor unit is coupled to the acquisition device using a sensor connector, the memory unit also being coupled to the sensor connector for enabling retrieval of the information stored in the memory unit using the sensor connector.

16. (original) An apparatus according to claim **1**, wherein communication with the remotely-located central controller provides wireless command and control for the apparatus.

17. (original) An apparatus according to claim **1** further comprising a processor associated with the acquisition unit and the communication device, the processor processing programmed instructions enabling a software-defined radio transceiver.

18. (original) An apparatus according to claim **1**, wherein the communication device includes a direct conversion radio transceiver for wireless communication between the apparatus and the remotely-located central controller.

19. (original) An apparatus according to claim **1** further comprising a processor in the acquisition unit for providing one or more of local control, time keeping, and power management.

20. (original) An apparatus according to claim **1** further comprising a power source disposed in the acquisition device for providing electrical power to one or more of the acquisition device, the sensor unit and the communication device.

21. (original) An apparatus according to claim **20**, wherein the power source is removable.

22. (original) An apparatus according to claim **20**, wherein the power source includes a rechargeable battery.

23. (original) An apparatus according to claim **22** further comprising an inductive coupling in the acquisition device, the inductive coupling being operably coupled to the rechargeable battery to allow charging of the rechargeable battery by a second power source external to the acquisition device.

24. (original) An apparatus according to claim **22** further comprising a connector disposed in the data acquisition device, the connector being operably coupled to the rechargeable battery to allow charging of the rechargeable battery by a second power source external to the acquisition device.

25. (original) An apparatus according to claim **22**, wherein the rechargeable battery comprises one or more of a nickel-metal hydride battery, a lithium-ion battery, and a lithium-polymer battery.

26. (original) An apparatus according to claim **1**, further comprising a GPS receiver associated with the sensor unit for determining the location parameter.

27. (currently amended) A method for for seismic data acquisition comprising:

a) sensing seismic energy in the earth using a sensor unit coupled to the earth;

b) sending a signal indicative of the sensed seismic energy from the sensor unit to an acquisition device co-located with the sensor unit;

c) storing information indicative of the signal in digital form in a first memory disposed in the acquisition device;

d) storing a location parameter in a second memory; and

e) directly communicating with a remotely-located central controller using a bi-directional communication device co-located with the sensor unit and the acquisition device.

28. (original) A method according to claim **27**, wherein the sensor unit is selected from one of a velocity sensor and a pressure sensor.

29. (original) A method according to claim **27**, wherein the sensor unit includes an accelerometer and signal is indicative of a sensed acceleration of the seismic energy.

30. (currently amended) A method according to claim **27**, wherein the sensor unit further comprises a multi-component sensor and the signal ~~in~~ is indicative of movement in at least two directions.

31. (original) A method according to claim **27**, wherein sending the signal includes sending a digital signal from the sensor unit.

32. (original) A method according to claim **27**, wherein sending the signal includes sending an analog signal from the sensor unit, the method further comprising digitizing the analog signal in the acquisition device.

33. (original) A method according to claim **27**, wherein storing information in the memory unit includes storing the information in a non-volatile memory.

34. (currently amended) A method according to claim **27**, wherein the memory unit further comprises a removable memory, the method further comprising removing the removable ~~a full~~ memory unit from the acquisition device after the information is stored therein to allow replacement of the ~~full~~ removable memory unit with ~~an empty~~ a fresh removable memory unit.

35. (original) A method according to claim **27**, wherein the memory unit includes an inductive coupling device, the method further comprising transferring the information stored in the memory unit to an external device using the inductive coupling device.

36. (original) A method according to claim **27**, wherein the memory unit includes an optical coupling device, the method further comprising transferring the information stored in the memory unit to an external device using the optical coupling device.

37. (original) A method according to claim **27**, wherein the sensor unit is coupled to the acquisition device using a sensor connector, the memory unit also being coupled to the sensor connector, the method further comprising retrieving the information stored in the memory unit using the sensor connector.

38. (original) A method according to claim **27**, wherein communicating with the remotely-located unit includes wireless communication of command and control signals for the acquisition device.

39. (original) A method according to claim **27** further comprising providing one or more of local control, time keeping, and power management using a processor disposed in the acquisition unit.

40. (original) A method according to claim **27** further comprising providing power to one or more of the acquisition device, the sensor unit and the communication device using a power source disposed in the acquisition device.

41. (original) A method according to claim **40**, wherein the power source includes a rechargeable battery, the method further comprising recharging the rechargeable battery using a second power source external to the acquisition device and coupled to the acquisition device using one of a connector and an inductive coupling.

42. (original) A method according to claim **27** further comprising providing a time keeping function using a clock circuit and processor disposed in the acquisition device.

43. (original) A method according to claim **42**, wherein a seismic data acquisition session is initiated by the time keeping circuit.

44. (original) A method according to claim **27** further comprising providing synchronization information to the acquisition device for time keeping from the remotely-located central controller.

45. (original) A method according to claim **27** further comprising initiating a seismic data acquisition session from the remotely-located central controller.

46. (original) A method according to claim **27** further comprising sending recording status information from the acquisition device to the remotely-located central controller in real time over a wireless communication link.

47. (original) A method according to claim **27** further comprising sending the information from the acquisition device to the remotely-located central controller in real time over a wireless communication link.

48. (original) An apparatus for detecting unwanted movement of a remotely-located seismic data acquisition device, comprising:

a) a sensor disposed in the seismic data acquisition device for detecting movement, the sensor providing a first signal indicative of the movement;

b) a processor coupled to the sensor for processing the first signal, the processor providing a second signal indicative of unwanted movement of the data acquisition device;

c) a communication device located with the sensor and the acquisition device to transmit the second signal to a central controller.

49. (original) An apparatus according to claim **48**, wherein the communication device is a wireless communication device.

50. (original) An apparatus according to claim **48**, wherein the sensor is acoustically coupled to the earth to sense seismic energy in the earth, the second signal being further indicative of seismic energy in the earth.

51. (original) An apparatus according to claim **48** further comprising a second sensor acoustically coupled to the earth to sense seismic energy in the earth, the second sensor providing a third signal indicative of the sensed seismic energy.

52. (original) An apparatus according to claim **51**, wherein the first signal and third signal are combined and the second signal includes the combined first signal and third signal.

53. (original) An apparatus according to claim **48**, wherein the sensor includes an accelerometer.

54. (original) An apparatus according to claim **48**, wherein the sensor includes a multi-axis accelerometer.

55. (original) A method for detecting unwanted movement of a remotely-located seismic data acquisition device, comprising:

a) detecting movement using a sensor disposed in the seismic data acquisition device, the sensor providing a first signal indicative of the movement;

b) processing the first signal using a processor coupled to the sensor, the processor providing a second signal indicative of unwanted movement of the data acquisition device;

c) transmitting the second signal to a remotely-located central controller using a communication device co-located with the sensor and the acquisition device.

56. (original) A method according to claim **55**, wherein transmitting the second signal includes transmitting the second signal using a wireless communication link.

57. (original) A method according to claim **55** further comprising sensing seismic energy in the earth using the sensor, the second signal being further indicative of seismic energy in the earth.

58. (original) A method according to claim **55** further comprising sensing seismic energy in the earth using a second sensor, the second sensor providing a third signal indicative of the sensed seismic energy.

59. (original) A method according to claim **58** further comprising combining the first signal and third signal, the second signal including the combined first signal and third signal.

60. (original) A method according to claim **55**, wherein detecting movement includes sensing acceleration with an accelerometer having one or more axes of sensitivity.

61. (currently amended) A system for seismic surveying, comprising:

a) a central controller;

b) a sensor unit remotely located from the central controller, the sensor unit coupled to the earth for sensing seismic energy in the earth and for providing a signal indicative of the sensed seismic energy;

c) a recorder device co-located with the sensor unit and coupled thereto for receiving the signal and for storing <u>in digital form</u> information indicative of the received signal in a first memory disposed in the recorder device;

d) a second memory for storing a location parameter associated with the sensor unit; and

e) a communication device co-located with the sensor unit and the recorder device for providing direct <u>bi-directional</u> communication with the central controller.

62. (original) A system according to claim **61** further comprising an energy source for providing the seismic energy in the earth.

63. (original) A system according to claim **61**, wherein the communication device includes a two-way wireless transceiver for wireless communication with the central controller.

64. (currently amended) An apparatus for seismic data acquisition comprising:

a) a sensor unit coupled to the earth for sensing seismic energy in the earth, the sensor unit providing a signal indicative of the sensed seismic energy; and

b) a wireless seismic recorder co-located with the sensor unit and coupled thereto for receiving the signal, the wireless seismic recorder including,

a memory unit for storing in digital form information indicative of the received signal and a wireless communication device for providing direct bi-directional wireless communication with a remotely-located central controller; and

c) a second memory for storing a location parameter associated with the sensor unit.

65. (original) A method for seismic data acquisition comprising:

a) transporting a seismic sensor unit to a seismic survey location;

b) deploying the seismic sensor unit;

c) determining one or more location parameters for the sensor unit;

d) updating one or more system parameters based at least in part on the determined location parameters; and

e) sensing seismic energy using the seismic sensor.

66. (original) A method according to claim **65**, wherein updating the one or more system parameters includes entering a system parameter at the sensor unit location.

67. (original) A method according to claim **65**, wherein updating one or more system parameters includes a system parameter at a central controller.

68. (original) A method according to claim **65**, wherein updating one or more system parameters includes automatically entering a system parameter using one or more devices in the sensor unit to determine the location parameters upon activation of the sensor unit.

69. (currently amended) A system for seismic data acquisition comprising:

a) a central controller;

b) a plurality of sensors disposed to form a seismic spread having a plurality of sensing locations;

c) a plurality recorders, each of the plurality of recorders recording seismic information corresponding to a selected sensing location from the plurality of sensing locations, each of the plurality of recorders being in direct bi-directional communication with the central controller.

70. (currently amended) An apparatus for seismic data acquisition comprising:

a) a plurality of sensors disposed to form a seismic spread having a plurality of sensing locations; and

b) a plurality recorders, each of the plurality of recorders recording in digital form seismic information corresponding to a selected sensing location from the plurality of sensing locations.

71. (original) An apparatus for seismic data acquisition comprising:

a) a sensor unit for sensing seismic energy, the sensor unit providing a signal indicative of the sensed seismic energy;

b) an acquisition device co-located with the sensor unit and coupled thereto for receiving the signal;

c) a memory unit disposed in the acquisition device for storing information indicative of the received signal; and

d) a direct-conversion radio transceiver for providing communication between the acquisition device and a remotely-located central controller.